4.6 NOISE

This description of the existing noise environment in the project area and the analysis of potential noise impacts of the Guadalupe River flood control project was derived in part from the noise impact assessment prepared for the *EIR/EIS for the Guadalupe River Flood Control Project* (Parsons Engineering Science 1997). The assessment was based on noise data obtained from available studies in the project region and field measurements of ambient sound levels.

Noise Measurement and Terminology

Noise is defined as unwanted sound that disrupts normal activities or that diminishes the quality of the environment. Noise is usually caused by human activity and is added to the natural acoustic setting of an area. Major noise sources that contribute regionally and locally to ambient noise levels are transportation-related (mobile) sources, including vehicular traffic, trains, aircraft overflights, and ship traffic. Other noise sources that contribute to local ambient noise levels are stationary sources, such as construction activity, that affect a smaller area.

Sound levels can be easily measured, but the variability in how people react to sound complicates measuring its impact. People judge the magnitude of sound sensation in relative terms such as "loudness" or "noisiness." Physically, sound pressure magnitude is measured on a sound-level scale and quantified in units of decibels (dB).

The human hearing system is not equally sensitive to sound at all frequencies. Because of this variability, a frequency-dependent adjustment called A-weighting has been devised so that sound may be measured in a manner similar to the way the human hearing system responds. The use of the A-weighted sound level is often indicated by using the abbreviation "dBA" for expressing the adjusted decibel measurement. An increase in the noise level of 10 dBA is judged by most people to be a doubling in loudness, whereas most people are unable to detect a change in level of less than 3 dBA.

In a typical outdoor environment, the noise level varies over time according to various activities in the community (e.g., an automobile passing by, an aircraft flying overhead, or a dog barking). Because of the time-varying noise level in a community, the description of the noise environment becomes more difficult without reference to a specific point in time. A description of the noise environment with a single number to represent an hour or even a whole day is desirable so that easy reference and comparisons can be made. A method widely used in the United States considers the average noise level over a period of time and is referred to as the equivalent level (L_{eq}). L_{eq} represents an average noise level in an environment where the actual noise level varies with time.

Land uses such as housing, religious, educational, convalescent, and medical facilities are more sensitive to increased noise levels than are commercial or industrial land uses. These noise sensitive land uses are referred to as noise sensitive receptors.

4.6.1 Regulatory Setting

Federal, state, and local governments have established noise guidelines and regulations to preserve quality of life in the community and to protect citizens from potential hearing damage and various other adverse physiological, psychological, and social effects associated with excessive noise. Several methods have been devised to relate noise exposure over time to community response.

The U.S. Environmental Protection Agency (EPA) has developed the day-night average noise level (L_{dn}) as the rating method to describe long-term annoyance from environmental noise. L_{dn} is similar to a 24-hour L_{eq} A-weighted, but with a 10 dB compensation for nighttime (10 P.M. to 7 A.M.) noise levels to account for increased annoyance by noise during normal sleep hours. The U.S. Air Force and the U.S. Department of Housing and Urban Development also use L_{dn} for evaluation of community noise impact.

The State of California has adopted the Community Noise Equivalent Level (CNEL) for environmental noise monitoring purposes. CNEL is similar to L_{dn} but includes a weighting of 5 dB during evening hours (7 P.M. to 10 P.M.), while

nighttime hours (10 P.M. to 7 A.M.) are weighted by 10 dB. For outdoor noise in a given environment, the federal L_{dn} noise is usually 0.5 to 1 dB less than CNEL.

The City of San Jose has adopted a Noise Element in their General Plan that contains land use and noise compatibility guidelines consistent with the above-mentioned federal and state guidelines. The city's guidelines address four noise level objectives that are to be evaluated in land use planning and development. These objectives are described in section 4.6.3.1.

4.6.2 Existing Conditions

The existing noise environment of communities along the Guadalupe River is affected by a number of noise sources, most of which are transportation-related (i.e., aircraft, railway, and roadway). Noise measurements conducted at various locations along the feasibility study area corridor indicate that aircraft overflights have an important influence on existing ambient noise levels, especially in the northern one-third of the study area. East of the San Jose International Airport, noise from aircraft operations affects residential properties along Guadalupe Parkway and Sonora, Santa Paula, and San Juan Avenues. South of the airport, noise from aircraft operations affects residential properties north of Willow Street along Palm Street, Harliss Avenue, and McLellan Avenue. Noise levels at these properties are between CNEL 60 dB and 65 dB. In addition, residential properties near the Almaden Expressway and I-87 are substantially influenced by traffic noise.

4.6.3 Environmental Effects

When considering a community's reaction to noise impacts, normalizing factors should be taken into account. According to the U.S. EPA (EPA 1974), the extent to which a community is sensitive to a noise activity will be influenced by the existing background noise level experienced. The higher the existing background noise, the less noticeable will be the new noise source. Similarly, the lower the existing background noise, the more objectionable the intruding noise will be judged by the community. The threshold for such an existing background noise level is between 58 to 62 dBA.

Another important factor is the attitude and awareness of the community toward the project (EPA 1974). If the community is aware that the operation causing the noise is necessary and will not continue indefinitely, the impact will be less objectionable. The result of background noise and community attitude could, for example, reduce the perceived noise level by 5 dBA to 15 dBA compared to other noise impacts where these factors are not involved (EPA 1974).

The duration of continual daily construction operations affecting a community is also considered. When the number of continual days of construction activities between breaks is short (less than two weeks, for example), communities will tolerate higher noise levels (CERL 1978). A break in construction activities lasting four or more days will give the community relief from noise impacts.

Impact Significance Criteria

CEQA Appendix G(p) states that "A project will normally have a significant effect on the environment if it will increase substantially the ambient noise levels for adjoining areas." Local jurisdictions have adopted Noise Element guidelines that provide guidance for determining a substantial increase in noise.

The City of San Jose's General Plan Noise Element contains four noise level objectives that are to be considered in land use planning. These objectives are (1) a long-range, exterior day-night average (L_{dn}) noise objective of L_{dn} 55 dBA; (2) a short-range, exterior noise objective of L_{dn} 60 dBA; (3) an interior noise objective of L_{dn} 45 dBA; and, (4) a maximum exterior noise level of L_{dn} 76 dBA that should not be exceeded in order to avoid significant adverse health effects. The last noise criterion addressing adverse health effects is based upon and would apply only to long-term operational noise impacts, and does not apply to temporary noise such as construction activities. The noise impacts of the proposed action would occur primarily during the construction phase, hence, the second objective most directly applies to this project.

The municipal code in the City of San Jose does not contain a noise ordinance to control specific, non-transportation type noise sources such as construction noise. The City's Noise Element includes the following statement concerning construction noise: "Construction operations should use available noise suppression devices and techniques."

For construction noise sources, it is appropriate to equate the average or equivalent noise level (L_{eq}) to L_{dn} when the disturbing noise does not occur during evening and nighttime hours from 7 P.M. to 7 A.M. An exterior noise criterion of L_{dn} 60 dBA is approximately equal to an L_{eq} of 62 dBA for construction noise in the above conditions. Hence, any construction noise levels at sensitive receptor locations that exceed an L_{eq} of 62 dBA would be considered a significant noise impact.

Channel Widening Plan

Assessment of construction noise requires a knowledge of the types of equipment to be used as well as the noise levels produced by each piece of equipment and an estimate of the amount of usage for each piece of equipment. Table 4.6-1 provides the data that were used in the assessment of construction noise during the five typical stages of public works construction operations: clearing, excavation, foundation, erection, and finishing. The use of diesel-powered heavy equipment, jackhammers, and gasoline-powered chainsaws would result in relatively high noise levels adjacent to the project area (Parsons Engineering Science 1997).

Construction noise would temporarily increase noise levels above the background noise in areas around the construction sites. Average overall construction noise levels of the various construction stages as experienced at various distances from a construction site have been calculated and are presented in Table 4.6-2. Channel Widening construction could cause noise levels of 63 to 70 dBA at 1,000 feet from the project area when construction activities are within a clear line-of-sight to the receptor. The noisiest construction activity would be excavation. During excavation activities, the potential noise levels could exceed the criterion by as much as 24 dBA at distances of 100 feet and by 8 dBA at distances of 1,000 feet. Therefore, noise-sensitive land uses up to a distance of 1,000 feet from the construction activity

would be exposed to construction noise exceeding L_{eq} 62 dBA, a significant impact. The impact would be mitigated to insignificance by adopting a Noise Mitigation Plan.

After completion of the construction phase of the flood control project, no significant noise impacts would occur. Activities such as routine and periodic maintenance that require access within the project right-of-way would generate insignificant noise levels due to their temporary duration. Short-term noise impacts that result from equipment used by clean-up crews after flooding on city streets would be generally eliminated, although equipment would still be required within the floodway to clear debris accumulations and fallen streets. Noise impacts generated by cleanup activities after very large floods would be substantially reduced. This is considered a long-term beneficial noise impact.

Bypass Channel Plan

The overall construction scenario noise levels of the various construction stages, as presented in Table 4.6-2 for the Channel Widening Plan, would be similar for the Bypass Channel Plan. Bypass Channel Plan noise impacts would differ due to the amount of excavation required and the locations of construction activity relative to the nearby residential land uses.

The Bypass Channel Plan calls for excavation of bypass channels in Reaches 7, 8, 9, and 11A. This has noise impact implications for two reasons: (1) as indicated in Table 4.6-2, excavation is the noisiest construction activity and (2) in some cases, construction of the bypass channels would generate construction noise affecting a greater number of residences. The Bypass Channel Plan would involve somewhat more excavation in Reach 7 due to construction of a bypass resulting in greater noise impacts. The Bypass Channel Plan would create much greater noise impacts in Reach 8 due to construction of a bypass instead of floodwalls. The Bypass Channel Plan would involve major construction in Reach 9, directly adjacent to residential neighborhoods, compared to no construction in Reach 9 for the Channel Widening Plan. The Bypass Channel Plan would involve more construction and more extensive noise impacts in Reaches 10 and 11. It would also involve considerable construction and noise impacts in Reach 12, compared to no construction in Reach 12 for the Channel Widening Plan. Impacts on Canoas Creek resulting from floodwall excavation would be identical to the Channel Widening Plan. Impacts from widening on Ross Creek would be slightly greater than the Channel Widening Plan. Due to their location close to sensitive residential noise receptors, these impacts would be significant but mitigated to insignificance by adopting a Noise Mitigation Plan.

No-Action Alternative

Under the No-Action Alternative, the noise-generating sources associated with project construction would not be employed. Existing noise sources would continue to contribute to ambient noise levels. Thus, the No-Action Alternative would result in no change in present ambient noise levels.

4.6.4 Mitigation Measures

Channel Widening Plan

1. The following noise control measures shall be included in a Noise Mitigation Plan designed to minimize construction noise impacts that could result from implementation of the Channel Widening Plan:

    a. Construction equipment shall be equipped with manufacturer's standard noise control devices (e.g., mufflers, lagging, and/or engine enclosures). Other noise control measures shall be implemented as necessary to comply with the local plans or development permit requirements. Equipment that meets SCVWD noise standards of 83 dBA at 25 feet (77 dBA at 50 feet) shall be used. Contractors shall be permitted to use equipment that is capable of exceeding the noise levels of 83 dBA at 25 feet provided that such equipment is operated in a manner that does not exceed the limits.

b. In no instance shall the noise level at any point outside the property line or temporary construction area exceed 86 dBA. In residential areas, no construction shall occur between the hours of 7:00 P.M. and 7:00 A.M. without City approval.

c. The use of temporary plywood barriers for noise reduction shall be determined on an individual basis by location, particularly in all areas where the construction activities would be within 200 feet of noise sensitive land uses (public, quasi-public, and residential uses) and construction is expected to continue for more than two weeks between breaks of four or more days.

d. Pavement breakers shall be used in place of jackhammers.

e. Pumps for diverting water flows shall be enclosed.

f. All construction equipment shall be inspected at periodic intervals to ensure proper maintenance and hence, lower noise levels, as well as compliance with the local general plan noise element policies.

g. Noisy operations shall be avoided when possible where construction progresses within 500 feet of noise-sensitive land uses. The distance between noisy construction related activities and noise-sensitive land uses shall be maximized. For example, construction-related truck routes shall avoid heavily populated residential streets, whenever possible. Truck routes along industrial or commercial streets or streets with mostly open space along them shall be required even though these routes may be longer and out of the way. Noisy stationary equipment shall be located away from project boundaries that are near noise-sensitive land uses.

h. Should pile driving be required due to special circumstances, only vibration/sonic-type pile drivers shall be used, with acoustically treated engine enclosures and mufflers, reducing noise levels to 85 to 90 dBA at 50 feet.

i. Construction shall not be continuous at any location for more than seven calendar days at a time except under emergency conditions.

The Noise Mitigation Plan would reduce overall construction impacts on the community would be lowered by 3 to 7 dBA. Table 4.6-3 shows the revised impacts at various distances from the approximate center of construction activities, as compared with noise levels shown in Table 4.6-2 (see section 4.6.3.2). Implementation of the following mitigation measures would provide sufficient noise reduction to achieve compliance with recommended noise construction criteria.

Table 4.6-3. Revised Construction Noise Levels

	Average Noise Level at Various Distances[a]			
Construction Stage	*100 ft.*	*200 ft.*	*500 ft.*	*1,000 ft.*
Clearing	77	72	66	60
Excavation	79	74	68	63
Foundation	79	74	68	62
Erection	77	72	66	60
Finishing	77	72	66	60

Note: a. The average noise level (Leq) produced during a construction stage is shown at various distances (with an unobstructed, clear line-of-sight) from the approximate center of construction activities. Noise levels are expressed in dBA. Background noise will increase the above noise levels as follows: when the background noise is equal to or within 1 dBA of the construction noise, the overall noise level is 3 dBA higher than those shown above; background within 2-3 dBA, an increase of 2 dBA; within 4-9 dBA, an increase of 1 dBA; and a background 10 dBA or more less than the construction noise below will not increase the overall noise level.

Source: Parsons Engineering Science 1997.

Bypass Channel Plan

All mitigation measures recommended for the Channel Widening Plan also apply to the Bypass Channel Plan.

4.6.5 Unavoidable Significant Adverse Impacts

Channel Widening and Bypass Channel Plans

Implementation of the Noise Mitigation Plan would avoid all significant adverse impacts from construction noise. No unavoidable significant adverse impacts would occur.